

New Models for Early Repolarization Syndrome

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Early repolarization (ER) pattern is characterized by J point elevation, J waves with and without ST segment elevation and slurring of the terminal part of the ECG in inferior limb and lateral precordial leads. These electrocardiographic manifestations of ER can be recapitulated in the coronary-perfused LV wedge preparation. The ionic and cellular mechanisms involved in generating ER patterns in the ECG appear to be similar to those responsible for Brugada syndrome. A net outward shift of current due to reduction of I_{Ca} or I_{Na} or augmentation of I_{K-ATP} has been shown to underlie ER, giving rise to J point elevation and distinct J waves with and without ST segment elevation.

Indeed, the wedge preparation is almost similar with Brugada syndrome model except for the site of ventricle and the inducibility of polymorphic VT. ER model has relatively lower VT inducibility when compared to Brugada syndrome model. The cause of difference may be due to the difference of Ito channel distribution. Transmural wedge preparations with dimensions of up to 32 x 20 x 15 mm are dissected from the left ventricle. The preparations are cannulated via a distal diagonal branch of the left anterior descending coronary artery, or a left marginal branch of the circumflex artery, or a branch of the posterior descending artery and perfused with cardioplegic

solution. Transmembrane action potentials are simultaneously recorded from two Epi and one Endo site with the use of floating microelectrodes.

Wedge preparation can represent only focal ventricular event. To overcome the limitation that the wedge preparation model represents a focal ventricular event not in whole heart or ventricles, coronary-perfused whole heart model has been being studied in canine model.

References

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